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Development of the language proficiency of five- to seven-year-olds in rural areas

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ABSTRACT

Rural children are a largely understudied population in language and literacy research, despite the fact that these children often enter school with delays in their language development. Since most rural areas suffered from so-called selective rural outmigration, many parents in rural areas are lower or middle educated. The home literacy climate, however, depends not only on the educational level of parents, but also on their lifestyle. In this study, we examined whether parental educational level and literacy use – as a feature of parental lifestyle – predict the language skills of children in Grade 1 in Northeast Netherlands. Structural equation modelling analyses revealed that the effect of parental literacy use on code-related skills is only significant in K-1 and K-2. In Grade 1, however, literacy use had a modest effect on oral language skills. The findings stress the importance of parents' literacy use for informational purposes.

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Rural areas; emergent literacy; language development; educational disadvantages; reading development; longitudinal research

Introduction

Rural children are a largely understudied population in terms of language and literacy research (Vernon-Feagans, Gallagher, & Kainz, 2010), despite the fact that many children in rural areas enter school with delays in their language development (De Marco & Vernon-Feagans, 2013; Durham & Smith, 2006; Vogels & Bronneman-Helmers, 2003). The low language proficiency of young children in rural areas is often overshadowed by discussions of problems in urban areas (Atav & Spencer, 2002; De Marco & Vernon-Feagans, 2013; Sheridan, Koziol, Clarke, Rispoli, & Coutts, 2014). Although children in rural and urban areas both lag behind in language proficiency, their early home experiences, prior to their school career, are starkly different as a consequence of differences in the socio-economic and cultural environment (Kloprogge, 2003; Miller & Votruba-Drzal, 2013; Vernon-Feagans & Cox, 2013): Rural areas are sparsely populated, the work force is less educated and less differentiated, and employment opportunities, in particular for the more highly educated, are rare (Fish & Pinkerman, 2003; Hospers & Reverda, 2012; Melis, 2013; Thissen, Fortuijn, Strijker, & Haartsen, 2010; Vernon-Feagans, Garrett-Peters, De Marco, & Bratsch-Hines, 2012; Vernon-Feagans et al., 2008). Therefore, this study will focus on how these socio-economic and cultural factors in rural areas relate to children's home environment, which we expect to be associated with early language and literacy development at the beginning of formal education.

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Rural socio-economic and cultural determinants of language and literacy development

Rural areas have been characterized as sparsely populated areas, in which families live isolated in villages or in small towns. Because of this isolation, it has been suggested that the qualities of rural families may play a greater role in children's development than do the qualities of urban families (Marotz-Baden, Hennon, & Brubaker, 1988; Vernon-Feagans & Cox, 2013). Another consequence is that social networks in rural areas are more likely to be kin-based (Kohler, Anderson, Oravecz, & Braun, 2004). Rural children may thus have less access to influences outside the family, resulting in a greater influence from their own families.

Another characteristic of many rural communities is economic in nature. Many rural areas have underdeveloped infrastructures and a scarcity of jobs, especially jobs offering opportunities for upward mobility (Das & De Feijter, 2009). The occupations that are available are usually low wage. Because of this, talented young people often move to urban areas where they can lift their socio-economic status (Fielding, 1992; Venhorst, 2012). This so-called rural outmigration leads to an imbalance in the labour force, with lower- and middle-educated workers being over-represented (Stockdale, 2006). This imbalance in educational level and labour force might affect the language experiences of children in many rural families *indirectly* via the language use of the parents. This requires further explanation. Anthropologically and ethnographically oriented research has revealed a relationship between the education and profession of parents, and the way parents use written and oral literacy at home (Barton & Hamilton, 1998; Heath, 1986a, 1986b). The opportunity for children to be introduced to a culture of literacy early on depends on the functions and uses of written literacy and related forms of oral literacy by their parents at home (Heath, 1986b).

Instrumental literacy, for example, refers to the use of literacy to accomplish practical goals or to obtain information for the practical needs of daily life (Heath, 1983, 1986a). Wells (1987) calls this *functional* use of literacy. Within this form of language use, reading is highly contextualized. For example, the local paper is read selectively, first by reading obituaries, followed by employment listings, ads, captions beneath pictures, and headlines (Heath, 1980). In contrast to instrumental literacy, *informational* or *epistemic* use of literacy is focused on gathering new information and knowledge (Wells, 1987). The function here of reading is *reading to learn* rather than *learning to read* (Heath, 1986a). Within this use of literacy, reading and oral language are decontextualized and beyond the immediate here and now. Literacy is focused on the communication of knowledge (Wells, 1987). In information-oriented home environments, children tend to learn more about their world and hear decontextualized language. From a linguistic point of view, the language they are exposed to is more complex. For example, the utterances they hear are longer, and tend to include more low-frequency words and more complex syntax (Rowe, 2013). From this so-called *academic language*, children are able to acquire tools to communicate and theorize efficiently and accurately about subjects beyond the here and now (Henrichs, 2010; Scheele, Leseman, Mayo, & Elbers, 2012; Schleppegrell, 2004). A certain level of mastery of these skills supports children in school, since these skills are regarded as important precursors of vocabulary knowledge (Pinkham & Neuman, 2012), grammar knowledge (Hoff, 2003; Vasilyeva, Waterfall, & Huttenlocher, 2008), and world knowledge (Kaefer, Neuman, & Pinkham, 2015), which, in turn, are related to reading comprehension (Cain, Oakhill, & Bryant, 2004; Leseman, Mayo, Messer, Scheele, & Vander Heyden, 2009; Rowe, 2013).

Whether parents use academic language or, to put it in more general terms, the way parents use oral and written literacy at home depends strongly on their educational level and the role literacy plays in their jobs, in their social network, and in their leisure time. Research by Leseman and colleagues (Leseman, 1999; Leseman & De Jong, 1998; Leseman & Van Tuijl, 2006) showed that high-educated parents had jobs with a higher degree of symbolic content as opposed to lower- and middle-educated parents, and that their use of language and literacy was mainly for informational and epistemic purposes, whereas lower-educated parents used language and literacy for instrumental purposes.

As a consequence of the rural outmigration of many higher-educated people, we therefore assume that, in many families in rural areas, the use of literacy is functional and instrumental rather than specifically aimed at gaining new knowledge. Our hypothesis, therefore, was that the literacy use of parents in rural areas will influence the language proficiency of young children. In this study, we focused on the use of literacy in rural families in the north-eastern part of the Netherlands, a region that is traditionally associated with language delays in young children (Driessen, 2013; Van der Vegt & Van Velzen, 2002; Van Oosterhout, 1992). We examined the effect of the literacy use of parents on the development of language and early literacy skills of five- to seven-year-old children in the early grades of formal education in the Netherlands.

Development of language and literacy skills

Literacy skills are often treated as an undifferentiated construct. Snow (1991), however, identified at least two trajectories of literacy development at school: *Word decoding* and *reading comprehension*. Storch and Whitehurst (2002) used a similar distinction when they identified *code-related skills* (CRS) and *oral language skills* (OLS). According to both models, word decoding is specifically predicted by preschool phonological and print skills, whereas reading comprehension is specifically predicted by preschool vocabulary, grammar, and world knowledge. De Jong and Leseman (2001) found in an urban sample that the relationships of home literacy facets with word decoding and reading comprehension changed differentially over time. Initially, in Grade 1, a strong correlation was found between home literacy and word decoding skills. However, from the end of first grade to the end of the third grade, this correlation *decreased*, while in the same period the correlation of home literacy with reading comprehension *increased*. To explain this change in pattern, the authors suggest that formal instruction in school has more of an effect on word decoding than on reading comprehension, since in the Netherlands the focus in the first years of school is on decoding. Thus, the influence of home literacy on the development of word decoding is limited to the initial stage of learning to read. Decontextualized language use becomes important from the moment that children are asked to derive meaning from text in reading comprehension, which is a requirement that increases gradually from Grade 3 onwards.

In our study, we expect a similar pattern for the effect that use of informational literacy by parents has on language and literacy skills. First, informational literacy, defined as dealing with literacy for epistemic purposes, also includes exposure to print. This could well be supportive for CRS, because children are introduced that way to the symbol system of written language (Mol, Bus, De Jong, & Smeets, 2008). Informational literacy, however, is also thought to entail *knowledge* (vocabulary and world knowledge) (Leseman & Hamers, 2007) and *skills* such as reasoning, predicting, justifying, theorizing, and explaining (Blank, Rose, & Berlin, 1978; Henrichs, 2010). Rowe (2013) showed that parents' use of decontextualized language is associated with children's later vocabulary, narrative skills, and reading comprehension skills. We therefore expect that the influence that informational literacy use by parents has on children is supportive both for the development of CRS, once children enter school at the age of four, and for the development of OLS later on. Since instruction in the early years of Dutch primary schools is primarily focused on decoding rather than on comprehension, we expect that the effect of informational literacy on CRS during the first two years will decrease, whereas the effect on reading comprehension will increase.

General cognitive abilities

To identify the unique influence of environmental factors, it is important to control for cognitive abilities that are known to contribute to early language and literacy skills. In this study, we will control for fluid intelligence, phonological working memory, and attention. *Fluid intelligence* (Gf) can be regarded as a general measurement of learning potential, independent of acquired knowledge

(Horn & Noll, 1997). It represents the ability to solve novel problems, which depends relatively little on stored knowledge (Nisbett et al., 2012).

With regard to *phonological working memory*, several studies have found that this ability is a significant predictor of children's vocabulary at preschool entrance and of vocabulary growth over the preschool years (Ebert et al., 2013; Gathercole, Willis, Emslie, & Baddeley, 1992). These studies have also shown that the effect of phonological working memory is reduced when home environment is included, suggesting a covariation of child and family characteristics. Phonological working memory is, therefore, seen as a highly determined genetic factor (Kovas et al., 2005).

Selective attention is the ability to select relevant information and simultaneously neglect irrelevant information (Gerhardstein & Rovee-Collier, 2002). It has frequently been regarded as a prerequisite for acquiring pre-literacy skills (Dally, 2006). Dice and Schwanenflugel (2012) concluded that attention in preschool is related to the development of early literacy skills, above and beyond the contribution of maternal education to these skills. These findings were consistent with a study by Walcott, Scheemaker, and Bielski (2010), who found that attention problems in pre-kindergarten predicted lower phonological awareness and letter knowledge one year later.

Northeast of the Netherlands

The northeast of the Netherlands is a rural region with, traditionally, a high number of children who enter primary school with language delays (Projectgroep Spraakmakend, 2007). The average disposable income of the families in the rural part of this region is below the national average, and unemployment in this part of the country is higher than the national average (Centraal Bureau voor de Statistiek [CBS], 2015). The majority of the labour force is middle educated (average vocational) (55% vs. 42% nationwide, CBS, 2015). The higher educated (college or more) are under-represented in this area (20% vs. 35% nationwide). Evaluation of the Educational Priority Policy, a national initiative whose aim is to reduce the education gap, showed that children in this region seem to benefit less from this policy than children in other regions (Driessen, 2013). Their language delays seem to be rather persistent (Inspectie van het Onderwijs, 2009). In particular, proficiency in vocabulary and reading comprehension is lower than that in other regions (Kruijer & Kassenberg, 2008). Research by Stellingwerf, Pulles, and Dusseljee (2004) in this area showed that aspects of home literacy, such as the number of books at home, the use of computer for informational purposes, and decontextualized talk, differentiated between lower- and higher-educated parents.

The present study

To summarize, we conclude that the home literacy climate depends on the literacy practices of parents. These practices are, in turn, dependent on their education, social network, and lifestyle. As a consequence of the fact that many parents in the northeast of the Netherlands are low and middle educated, we presuppose that in many families in this area language and literacy use is functional and less oriented towards gathering new information and knowledge. Following De Jong and Leseman (2001), we also presuppose that the relationship of home facets to CRS and OLS changes over time. We therefore expect that the influence of literacy use on CRS is strong in kindergarten but decreases in Grade 1, and that the influence of literacy use on OLS increases during these three years. To identify these environmental influences, we will control for the general cognitive abilities (GCA) of fluid intelligence, phonological working memory, and attention.

The current study has three main goals. The *first* goal is to describe the socio-economic and cultural factors that are expected to influence the language and literacy development of young children in Northeast Groningen. *Second*, this study aims to investigate whether parental literacy use in the pre-K period in the northeast of the Netherlands can be seen as a predictor of language and literacy skills in Grade 1. The *third* goal is to investigate whether the effect of literacy use is specific over time. The three research questions are as follows:

(1) How can we characterize the socio-economic and cultural factors that are expected to influence the language development of children in Northeast Groningen at the beginning of formal education?
(2) Does the literacy use of parents in the pre-K period predict the language proficiency of children in Grade 1, controlled for GCA?
(3) Is the influence of literacy use on language development specific in the pre-K period? Does the influence on vocabulary increase and does the influence on decoding decrease between K-1 and Grade 1?

Method

Participants

The participants were 128 children (72 boys and 56 girls) from 11 schools in the Dutch town of Delfzijl and its surroundings. Children in their first year in kindergarten (K-1) for at least one month in spring 2011 were included. As a consequence of referrals and removals, 15 pupils were lost (see Table 1).

In the first year, the parents of the 128 children were invited to fill in a questionnaire, which took about 15 minutes. The response rate was 62% (82 lists). Nearly half of the parents who filled in the questionnaire were middle educated (Table 2).

Procedure

We invited all schools of the school board which provides education in 28 schools to almost 89% of the pupils in the municipalities of Delfzijl and Appingedam (total 37,000 residents) to participate in this research. In the end, 11 schools volunteered, with 14 K-1 classes. The pupils were assessed in spring for three consecutive years (2011–2013) by trained students in a master's degree programme, using laptop as well as paper-and-pencil tasks (see instruments) in two sessions. In 2011, the parents of 130 children were informed about the research and sent a letter containing information about the study, in which they were explicitly given the opportunity to withdraw their child from participation by notifying their teacher. Two children were withdrawn by their parents.

Instruments

Socio-economic and cultural characteristics

Maternal education was measured using a questionnaire. An 8-point scale was used, varying from *no qualification* (1) to *higher education* (8). *Parents' literacy*: Three scales, developed by Leseman and De Jong (1998), were adapted to measure three different aspects of parents' literacy use. The *first* scale,

Table 1. Number of participants per year, their average age in months and SD.

	2011			2012			2013		
	N	*M*	SD	*N*	*M*	SD	*N*	*M*	SD
No. of children	128	58.8	4.46	120	70.1	4.43	113	82.4	4.46

Table 2. Educational attainment of parents ($N = 82$).

	Mother (%)	Father
Low	11.0	17.1
Middle	48.8	48.8
High	39.0	28.0
Unknown	1.2	6.1
	100	100

Informational literacy, contains nine items describing the genre of books referred to as didactic-critical/educational (Heath, 1986a), and informative and epistemic (Wells, 1987). This scale represents *decontextualized* discourse. Parents were asked how often they read literary novels, history books, textbooks, international political news articles, popular science articles, or used an encyclopaedia, and so forth (0 = never; 3 = very often). The score is the mean of the nine items (Cronbach's $\alpha = .83$). The *second* scale, *Recreational literacy*, referred to parents' use of literacy for *recreational* goals. A list of 11 recreational activities was presented. Parents were asked to indicate how often they engaged in the activity mentioned. Conceptually, the scale was related to the type of literacy, referred to as social-interactional/recreational by Heath (1986a), with an emphasis on the recreational aspect. The scale can be regarded as an indicator of *contextualized* discourse. The score is the mean of the 11 items (Cronbach's $\alpha = .59$). The *third* scale was used to determine the symbolic content of parents' most recent job. Leseman and De Jong (1998) derived a questionnaire for this scale from Kohn and Schooler (1983). The parents were asked to indicate the degree of literate and symbolic content of their daily job activities. Answers were rated on a 4-point scale ranging from never (0) to very often/every day (3). The questionnaire listed nine work content items; for instance, the use of manual tools and heavy machines versus paper and pencil, written reports, and computers. The internal consistencies of the job content measurements were satisfactory (Cronbach's $\alpha = .72$).

General cognitive abilities

Fluid intelligence was measured by two subtests of the Wechsler Non-Verbal (WNV) test: *Matrices* and *Recognition* (Wechsler & Naglieri, 2008). The IQ-score was used. *Selective attention* was measured using the Pre-Cool Aandachtstaak (Pre-Cool Attention Test), a computerized visual search task, based on the work by Gerhardstein and Rovee-Collier (2002), and Scerif, Cornish, Wilding, Driver, and Karmiloff-Smith (2004). The child had to locate as many targets (elephants) as possible, while ignoring distractors (bears and horses) that looked highly similar in terms of colour and shape. Each session counted four items, in which the ratio of targets and distractors varied at random: 1:5, 1:8, and 1:11. Throughout the task, children were encouraged to search as fast as possible. The number of unique pointed targets was measured per item. The average of the four-item scores was calculated per session. The final score was the mean score of two sessions. Cronbach's alpha of this task, as reported by the Pre-Cool research consortium, is .89 (Onderzoeksconsortium pre-COOL, 2012). *Phonological working memory* was tested using the Dutch version of the Automated Working Memory Assessment (AWMA) Digit Recall (Alloway, Gathercole, & Pickering, 2006). Raw scores were used. The test–retest reliability of this subtest is .84 (Alloway et al., 2006).

Language

Language proficiency was divided between the two precursors of literacy that were distinguished by Storch and Whitehurst (2002): CRS and OLS. CRS in K-1 and K-2 were measured using the OnderBouw Informatie Systeem (OBIS) test (Van der Hoeven, 2005), which was based on the British Performance Indicators in Primary Schools (PIPS) test (Tymms, 1999). The code-related capacities were measured by two sets of tasks: *Early reading* and *Phonics*. Early reading capacities were measured by four subtests: *Writing (invented spelling)*, *Ideas about Reading (IaR)*, *Letters*, and *Words*. The score was calculated by summing all four scores. The Phonics component was measured by summing the scores for the two subtests *Rhyming* and *Repeating*. The test–retest reliability of the total OBIS was .98 (Van der Hoeven, 2005). CRS in Grade 1 were measured by three instruments representing three main aspects of reading: phonological awareness, naming letters, and reading. *Phonological awareness* was measured using the subtest *phoneme deletion* of the *Fonemische Analyse Test* (FAT; Phonological Analysis Test) (Van den Bos, Spelberg, & De Groot, 2010). Two criteria were measured: speed and accuracy, which were converted to an index score (*t*-score). The average reliability score was .98 (Van den Bos et al., 2010). *Naming letters* was measured using the *Grafementoets* (Grapheme Test), which is part of the *Drie Minuten Toets* (DMT; Three-minute Test), a Dutch reading test (Centraal Instituut voor ToetsOntwikkeling, 2010). Speed and accuracy were measured. Speed was operationalized

by reading time, measured in seconds. Accuracy was measured by summing the correct named letters (max = 34). Cronbach's alpha for the DMT is between .95 and .97 for the various assessing moments (Krom, Jongen, Verhelst, Kamphuis, & Kleintjes, 2010). *Reading* was assessed by using the *Monosyl*, which is a part of the test Continu Benoemen & WoordLezen (CB &WL; Rapid Naming and Word Reading) (Van den Bos & Lutje Spelberg, 2010). Fifty highly frequent, semantically non-related one-syllable words had to be read, while the reading time was measured. Reading speed scores were converted into a scale score ($M = 10$; SD = 3). The split-half reliability of this subtest was .91 (Van den Bos & Lutje Spelberg, 2010). OLS in K-1 and K-2 were measured by two *receptive vocabulary tests*. In *Picture Vocabulary* (OBIS-PV), part of the OBIS test (Van der Hoeven, 2005), the child was asked to point to various objects in a pictured scene. There were three different scenes. The score was the sum of correctly pointed objects in these three scenes. In K-1 receptive vocabulary was also measured using the Diagnostische Toets Tweetaligheid (DTT; Diagnostic Bilingualism Test) (Verhoeven, Narain, Extra, Konak, & Zerrouk, 1995). In K-2 the Dutch version of the revised Peabody Picture Vocabulary Test (PPVT-III-NL) was used. The test–retest reliability for this test was .94 (Schlichting, 2005). In both tests, four pictures were presented on a laptop screen, and the child had to point to the picture that matched the word voiced by the computer test. For both tests, *raw scores* were used. OLS in Grade 1 were measured by tests of receptive vocabulary, productive vocabulary, and grammar knowledge. For *receptive vocabulary*, the PPVT-III-NL was also used. *Productive vocabulary* was assessed by using the Words subtest of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-III-NL, Hendriksen & Hurksen, 2009). Raw scores were used. *Grammatical knowledge* was assessed using the Zinsbouw Keuzetest (ZbK; Syntactic Choice Test), a subtest of the *Taaltest voor Kinderen* (Language Test for Children) (Van Bon & Hoekstra, 1982). The child had to select one of the two pictures presented, which matched with the sentence that was voiced by the test assistant. The test contained 37 items. Raw scores were used. The internal consistency reliability, measured by the Kuder Richardson parameter (KR20), had values between .75 and .80 across different age intervals (Van Bon & Hoekstra, 1982).

Analysis

The first research question will be answered by presenting descriptive data of the socio-economic and cultural background variables of the parents. The second and third research questions will be answered by Structural Equation Modelling (SEM), using LISREL 9.10 (Jöreskog & Sörbom, 2013). The input to the LISREL path model was in the form of the Spearman correlation matrix (see the appendix). Prior to the analysis, the Intra-Class Correlation (ICC) and Design Effect will be determined in order to examine whether multilevel analysis is required, since the data have a nested structure. Children were nested in 14 classrooms of 11 schools, with one school having 4 classes. Since in 10 of the 11 schools the school level matches the classroom level, we will only examine a two-level model.

The analysis model was built as follows: Informational literacy (InfoLit) as a background characteristic of the parents and GCA as indicators of the learning potential of the child will be used as exogenous variables. CRS and OLS as dependent variables in K-1 (K1-CRS, resp. K1-OLS), K-2 (K2-CRS, resp. K2-OLS) and Grade 1, respectively (GR1-CRS resp. GR1-OLS), are used as endogenous variables. To reduce the number of variables, the second-order component score for GCA, CRS, and OLS was estimated by means of Principal Component Analysis (PCA). To investigate the stability of the CRS and OLS, respectively, the relationships within both domains will be freed during the successive three years. We expected that *informational literacy* and *GCA* would influence CRS and OLS *directly* in K-1, and *indirectly* in successive years. According to the results of the study by Storch and Whitehurst (2002), we expected that CRS in K-1 would be highly influenced by OLS in K-1. Therefore, we will free this relationship. The fit of the model will be evaluated by using four goodness-of-fit measurements: Bentler's Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), the chi-square test of goodness of fit (χ^2), and the chi-square/df ratio, with CFI > .95, RMSEA < .05, and the chi-square/df ratio < 2.0 indicating good fit (Ullman, 2001).

Results

The results will be presented in two sections. The first section contains descriptive information about the socio-economic and cultural background variables of parents, the GCA of the children, and the language proficiency of the children in successive years. Additionally, correlations between these variables are presented. Prior to the final analyses using SEM in the second section, preliminary analyses using PCA were executed to reduce the number of variables for the model.

Descriptive statistics

The means and standard deviations for the socio-economic and cultural background characteristics of the parents, and all assessments, from K-1 to Grade 1, are presented in Table 3, reporting both raw and standard scores, where available. With regard to the background characteristics, the difference between the means of *recreational literacy* ($M = 1.3$) and *informational literacy* ($M = 0.6$) is remarkable (Cohen's $d = 1.76$), indicating that parents prefer using literacy for recreational than for epistemic purposes. This indicates that the literacy use of most parents is predominantly contextualized. The mean of 0.6 for *informational literacy* indicates that, on average, parents use books and magazines for extending knowledge less often than 'sometimes'. The average score of the job content scale was 1.3, indicating that the degree of parents' use of symbolic content in their job is slightly more often than 'sometimes'. Note that the SD is relatively large (.55), suggesting a large variability in job content within this group.

To evaluate the assessment scores per grade, the sample was divided into two groups. In the first group ('list completed'), children were included whose parents completed the questionnaire ($N = 82$). The parents of the children in the other group ('not completed') did not complete the questionnaire ($N = 46$). The results revealed that the sample was selective. Children whose parents completed the questionnaire scored higher in K-1 than the children whose parents did not complete the list on *Early reading* ($t_{(121.7)} = 4.32$, $p = .000$), *Phonics* ($t_{(126)} = 2.76$, $p = .007$), and the DTT ($t_{(124)} = 2.47$, $p = .015$). With regard to GCA, the mean WNV score of the first group ($M = 96.6$, SE = 1.88) was significantly higher than the mean score of the second group ($M = 89.9$, SE = 2.33) ($t_{(126)} = 2.20$, $p = .030$). The same pattern appeared in the K-2 scores, where the differences in scores for *Early reading* ($t_{(124)} = -3.73$, $p = .00$) and PPVT-III-NL ($t_{(124)} = -3.09$, $p = .02$) were significantly higher in the group of children whose parents completed the questionnaire. In Grade 1, only the difference in scores for the PPVT-III-NL was significant ($t_{(123)} = -2.81$, $p = .006$). The tendency seems to be that initial differences in CRS between the two groups decreased, whereas differences in receptive vocabulary remained. In Grade 1, the standardized means of PPVT-III-NL and Monosyl in our sample were all at the national average level, indicating that there were no delays for the present sample in terms of receptive vocabulary and word reading. The absolute growth of the standardized scores for *receptive* vocabulary between K-2 ($M = 99.5$, SE = 1.51) and Grade 1 ($M = 103.3$, SE = 1.30) was significant ($t_{(118)} = 3.11$, $p = .002$). The growth of *productive* vocabulary in K-2 ($M = 8.7$, SE = .25) and Grade 1 ($M = 9.2$, SE = .23) was also significant ($t_{(119)} = 2.20$, $p = .030$). The scores for *Naming Letters* showed ceiling effects as the mean of the accuracy score (31.2) approached the maximum score (34) and the standard deviation was relative small (5.21). This indicates that the majority of the pupils learned most graphemes in spring.

Data reduction

To reduce the number of variables for SEM, in view of the relatively small sample size (N = 67), second-order variables for GCA, CRS, and OLS were estimated using exploratory PCA prior to the analysis.

Table 3. Descriptors of parental background characteristics, GCA, and language development in K-1, K-2, and Grade 1.

	Kindergarten-1				Kindergarten-2				Grade 1			
	List completed		Not completed		List completed		Not completed		List completed		Not completed	
	N	*M* (SD)	*N*	*M* (SD)	*N*	*M* (SD)	*N*	*M* (SD)	*N*	*M* (SD)	*N*	*M* (SD)
Background characteristics												
Maternal education	81	5.2 (1.86)										
Recreational literacy	81	1.3 (0.35)										
Informational literacy	81	0.6 (0.44)										
Job content	78	1.2 (0.55)										
GCA												
AWMA Digit Recall	82	16.5 (3.86)	45	15.3 (4.26)	–	–	–	–	–	–	–	–
Pre-Cool Attention Test	79	6.7 (0.64)	45	6.6 (0.61)								
WNV	82	96.6 (17.04)	46	89.9 (15.80)								
LANGUAGE DEVELOPMENT												
Code-related skills												
Early reading	82	17.1 (11.48)	46	9.7 (7.73)	74	33.3 (11.56)	52	25.3 (12.46)				
OBIS Writing	82	2.4 (1.72)	46	1.9 (1.94)	74	4.0 (1.22)	52	3.7 (1.17)				
OBIS (IAR)	82	4.8 (1.78)	46	3.6 (1.68)	74	6.8 (1.81)	52	6.0 (1.94)				
OBIS Letters	82	8.1 (7.59)	46	3.5 (4.61)	74	17.1 (7.71)	52	12.4 (8.44)				
OBIS Words	82	1.9 (2.58)	46	0.7 ((1.89)	74	5.5 (3.71)	52	3.2 (3.59)				
Phonics	82	11.6 (4.07)	46	9.6 (3.74)	74	14.8 (2.61)	52	13.8 (3.07)				
OBIS Repeating	82	5.3 (2.24)	46	4.5 (2.26)	74	6.8 (1.67)	52	6.3 (1.93)				
OBIS Rhyming	82	6.3 (2.80)	46	5.0 (2.97)	74	8.0 (1.73)	52	7.5 (2.02)				
Phonemic awareness												
FAT – speed									75	68.6 (36.77)	50	59.5 (34.04)
FAT – accuracy									75	7.0 (2.83)	50	6.9 (3.29)
FAT – t-score									75	39.8 (13.86)	48	42.0 (14.17)
Naming letters												
Naming letters – speed									75	32.9 (24.49)	50	40.1 (31.09)
Naming letters – accuracy									75	31.5 (4.31)	50	30.6 (6.35)
Reading												
Monosyl – speed									74	110.4 (105.08	47	136.1 (110.59)
Monosyl (st. sc.)									72	10.9 (4.48)	45	9.8 (4.51)
Oral language skills												
Receptive vocabulary												
DTT (rs)	82	28.8 (6.62)	44	25.4 (8.30)								

OBIS Picture Vocab.	82	24.5 (6.65)	46	23.0 (8.04)								
PPVT-NL (rs)					75	81.9 (12.27)	51	74.1 (15.84)	75	94.8 (9.72)	50	89.3 (11.93)
PPVT-NL (WBQ)					75	102.8 (15.45)	51	94.7 (16.57)	75	105.8 (12.64)	50	99.1 (15.45)
Productive vocabulary												
WPPSI-III-NL Words (rs)					75	20.9 (5.59)	52	20.1 (6.20)	75	26.1 (5.52)	50	25.6 (5.16)
WPPSI-III-NL Words (st. sc.)					75	8.7 (2.52)	52	8.5 (2.87)	75	9.2 (2.53)	50	9.1 (2.50)
Grammatical knowledge												
ZBK Sent. Sel. Task (rs)									75	34.3 (2.49)	50	34.3 (2.26)
ZBK Sent. Sel. Task (st. sc.)									75	5.4 (1.64)	50	5.5 (1.44)

General cognitive ability

A PCA with varimax rotation and Kaiser normalization was conducted on three GCA variables in K-1: fluid intelligence (WNV), phonological working memory (AWMA Digit Recall), and selective attention (Pre-Cool Attention Test). This procedure resulted in one component, which explained 50.38% of total variance. The factor loadings for fluid intelligence, phonological working memory, and attention were .74, .66, and .73, respectively. Factor scores were used for the main analyses.

Code-related skills K-1 (K1-CRS) and K-2 (K2-CRS)

A PCA with varimax rotation and Kaiser normalization was conducted on two CRS variables in K-1: *Early reading* and *Phonics*. This procedure resulted in one component, which explained 79.76% of total variance. Both variables loaded .89 on the factor. The same analysis was conducted on *Early reading* and *Phonics* in K-2. The analysis showed that only one component met Kaiser's criterion of 1, which explained 75.33% of the total variance. Both variables loaded .87 on the factor.

Oral language skills K-1 (K1-OLS) and K-2 (K2-OLS)

A PCA was conducted on two oral language variables in K-1: DTT and OBIS-PV. This procedure resulted in one component, which explained 75.13% of total variance. Both variables had factor loadings of .87. The same analysis was conducted on PPVT-III-NL and OBIS-PV in K-2. The analysis also resulted in one component, which explained 79.96% of total variance. Both variables loaded .84 on the factor.

Grade 1 code-related skills (GR1-CRS) and oral language skills (GR1-OLS)

A PCA with varimax rotation and Kaiser normalization was conducted on five language variables in Grade 1: Phonemic awareness (FAT), word reading (Monosyl), receptive vocabulary (PPVT-III-NL), productive vocabulary (WPPSI-III-Words), and grammar knowledge (ZbK) (see Table 4). Naming letters is also a relevant code-related skill, but was not included due to severely limited variance as a consequence of ceiling effects. At the time of the assessment, most children apparently knew all the graphemes. For FAT and Monosyl, standardized scores were used, which combined speed and accuracy measurements, whereas for the other three instruments, the raw scores were used. The PCA resulted in two components, explaining 66.34% of total variance. Table 4 shows the factor loadings. The items that cluster in the same components suggest that component 1 represents *OLS* and component 2 *CRS*. The factor scores were used as input for the SEM model.

Correlations

Table 5 contains the correlations of the socio-economic and cultural determinants (maternal education, informational literacy, recreational literacy, and job content) with the factors obtained for child cognitive ability, CRS, and OLS. The table shows that *recreational literacy* had no relationship with any of the other components, or with any of the other determinants or with any of the outcome measurements. Therefore, *recreational literacy* will not be used in any further analysis. *Job*

Table 4. Rotated factor loadings for GR1-CRS and GR1-OLS.

	Component	
	GR1-OLS	GR1-CRS
Monosyl (st. sc)	.123	**.879**
FAT (*t*-score)	.213	**.853**
PPVT-III-NL (rs)	**.859**	.023
WPPSI-III-Words (rs)	**.645**	.204
ZbK (rs)	**.714**	.220
Eigenvalues	2.26	1.06
% of total variance	45.22	21.12

Table 5. Correlation matrix of the environmental characteristics, GCA of the children, and successive language scores in K-1, K-2, and Grade 1, divided into CRS and OLS.

	Environment				GCA	K-1		K-2		Grade 1	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
Environmental factors											
1. Maternal education		.360**	−.064	.197	.100	.332**	.149	.225	.037	.286*	.198
2. Informational literacy			.241	.484***	.157	.280*	.229	.175	.218	.141	.362**
3. Recreational literacy				−.021	−.031	−.111	.038	−.182	.234	−.213	.062
4. Job content					.029	.086	.046	.111	−.075	−.012	.204
GCA											
5. GCA						.552***	.608***	.493***	.369**	.483***	.372**
Language skills kindergarten 1											
6. CRS K-1							.643***	.802***	.479***	.601***	.326**
7. OLS K-1								.484***	.662***	.310*	.514***
Language skills kindergarten 2											
8. CRS K-2									.418**	.723***	.223
9. OLS K-2										.211	.409**
Language skills Grade 1											
10. CRS Gr. 1											−.049
11. OLS Gr. 1											

***$p < .001$; ** $p < .01$ level; *$p < .05$.

content was strongly related to *informational literacy*. This indicates a close relationship between language use at home and at work. In contrast to *informational literacy*, however, *job content* was not related to any of the outcome measurements. Therefore, *job content* will also be omitted from any further analysis. *Informational literacy* is related to CRS in K-1, but had no relationship to OLS. In Grade 1, this pattern of relationships shifted. The relationship between *maternal education* and language skills was only significant with CRS in K-1 and Grade 1. The significant correlation between maternal education and *informational literacy*, the inconsistent links of maternal education over time with the outcome variables, and the fact that *informational literacy* is supposed to be a more proximal factor than maternal education are the reasons we will not use maternal education in our further analysis, but will use *informational literacy* instead. The development of CRS and OLS, respectively, seemed to be rather stable over the years, in light of the high correlations within both domains.

Structural equation modelling

To map the development of CRS and OLS during the first three years at school, to test the influence of the GCA (fluid intelligence, attention, and phonological memory) and environmental influences (informational literacy), and to investigate whether the influence of informational literacy is selective, we tested the model using LISREL 9.10. Prior to modelling, we examined whether multilevel analysis was required by calculating the ICC. An ICC of 10% or more is acknowledged to demonstrate classroom-level variability. The ICC values on classroom level ($N = 14$) were 0.07 for GR1-CRS and 0.06 for GR1-OLS, respectively, indicating that no multilevel approach was required. In addition to the ICC calculation, the design effect was calculated with the formula 1 + (average cluster size − 1) * intra-class correlation. A design effect >2.0 indicates the necessity for a multilevel approach (Peugh, 2010). The design effects were below 2.0 (1.53 for GR1-CRS and 1.46 for GR1-OLS, respectively), which also confirmed that a multilevel approach was not required.

The first step in our main analysis was testing the model, as described in the analysis section, yielding a reasonable model fit: Bentler's CFI = .95; RMSEA = .12; $\chi^2_{(17)} = 33.24$, $p = .011$; χ^2/df ratio = 1.96. The second step was to examine the LISREL modification indices in order to improve the model fit. The modification indices suggested freeing the link of the GCA parameter on the OLS parameter in Grade 1 (γ 6,2), which indicated a direct effect of GCA on OLS in Grade 1. This makes sense, since GCA are regarded as contributing to OLS (Dickens, 2005; Gerhardstein & Rovee-Collier, 2002; Swanson & Alloway, 2012). This led to an improvement of the model fit: CFI = .98; RMSEA = .090; $\chi^2_{(16)} = 24.73$, $p = .07$; chi-square/df ratio = 1.54. Not only did this step improve the model fit, but it also increased the total explained variance for OLS from 16.3% to 25.4%. The next step in the examination of the modification indices suggested freeing up the link that *informational literacy* had with OLS in Grade 1 (γ 6,1), which would seem to suggest an increasing relevance of informational literacy on OLS in Grade 1. This then led to an acceptable fit of the model: CFI = .99; RMSEA = .053; $\chi^2_{(15)} = 17.80$, $p = .27$; chi-square/df ratio = 1.19. The final model explained 52.1% of the total variance of CRS and 30.9% of the total variance of OLS in Grade 1. This final model is shown in Figure 1. Additionally, in Table 6, the *direct* (*DE*), *indirect* (IE), and *total* effects (TE) of the standardized solution are presented. Testing the SEM model showed four notable findings. The first finding concerned the increasing significance of informational literacy in this rural area in terms of language development. In other words, literacy use by parents for educational and informational purposes at home, at the beginning stage of formal education, had an important relationship to language development, in particular to OLS in Grade 1. In K-1 and K-2, the role of informational literacy was modest; the *direct* effects of informational literacy on both CRS and OLS in both years were not significant. Only the *total* effects on CRS in both years were significant at 5%. The importance of informational literacy, however, increased from K-1 to Grade 1. While the effect of informational literacy on CRS remained small, compared to the direct effects in K-1 (TE = 0.12), the direct (0.26) and total effects (0.28) of informational literacy on OLS in Grade 1 increased. Note that this effect came about on top of the effects

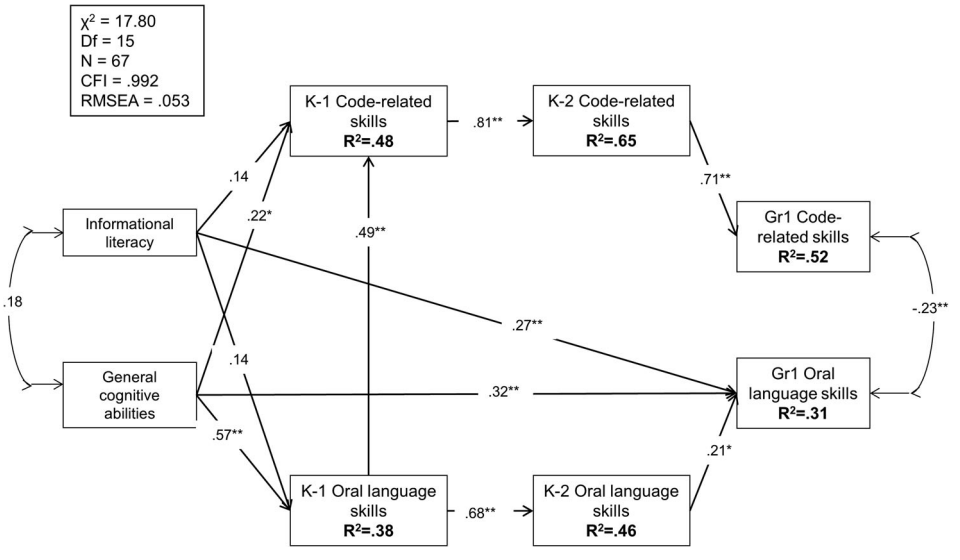

Figure 1. Structural model of literacy development from K-1 through first grade.

of the development of the OLS in the preceding years and the influence of GCA. A second finding was that, in contrast with the increasing importance of informational literacy, the influence of GCA decreased, although it did remain substantial. The total effects of the GCA in K-1 were about 0.50, while the total effects in Grade 1 were less than 0.30 for CRS and about .40 for OLS. A third

Table 6. Standardized solution of total effects (TE), direct effects (DE), indirect effects (IE), and estimated correlations (*R*).

				1st year kindergarten		2nd year kindergarten	
		Informational literacy	GCA	K-1 CRS	K-1 OLS	K-2 CRS	K-2 OLS
1st year kindergarten							
K-1 CRS	TE	0.213*	0.499**		0.487**		
	DE	0.145	0.220*		0.487**		
	IE	0.068	0.297**		–		
	R	**0.300***	**0.536****		**0.653****		
K-1 OLS	TE	0.140	0.573**				
	DE	0.140	0.573**				
	IE	–	–				
	R	**0.240**	**0.597****				
2nd year kindergarten							
K-2 CRS	TE	0.172*	0.403**	0.808**	0.393**		
	DE	–	–	0.808**	–		
	IE	0.172*	0.403**	–	0.393**		
	R	**0.242**	**0.433****	**0.808****	**0.528****		
K-2 OLS	TE	0.095	0.389**		0.680**		
	DE	–	–		0.680**		
	IE	0.095	0.389**		–		
	R	**0.163**	**0.406****		**0.680****		
Grade 1							
Grade 1 CRS	TE	0.124*	0.291**	0.583**	0.284**	0.722**	
	DE	–	–	–	–	0.722**	
	IE	0.124*	0.291**	0.583**	0.284**	–	
	R	**0.175**	**0.312****	**0.583****	**0.381****	**0.722****	
Grade 1 OLS	TE	0.282**	0.394**		0.142*		0.209*
	DE	0.262**	0.312**		–		0.209*
	IE	0.020	0.081		0.142*		–
	R	**0.351****	**0.443****		**0.391****		**0.378****

**Significant at the .01 level; *significant at the .05 level.

notable finding concerns the development of OLS. As Storch and Whitehurst (2002) concluded, the importance of OLS for the development of CRS in the early stage of literacy development was obvious. There was a substantial relationship between OLS in K-1 and CRS in K-1. OLS in K-1 were important not only for the development of CRS, but also for the development of these skills in successive years. One last notable point is that proficiency in CRS at the beginning of formal education appeared to be a good predictor of these skills in successive years. Not only were the *direct* effects of CRS over the successive year stable, but the *indirect* effect of CRS in K-1 on CRS in Grade 1 via CRS in K-2 was also substantial ($\beta = 0.58$). In contrast to the stability of CRS over the years, there was a decline in the values of the betas of the OLS between K-2 and Grade 1 to .21.

Discussion

The main topic of the current study concerns the question of how socio-economic and cultural factors in rural areas relate to children's home environment, and how children's home environment affects the early language and literacy development of children in the early grades of formal education. Our focus was narrowed to the countryside in the northeast part of the Netherlands.

The first research question concerns the socio-economic and cultural characteristics of the parents in this area. We therefore looked at educational attainment, language use, and the degree of symbolic content in jobs. With respect to educational attainment, people with a low to intermediate (vocational) level of education were over-represented in our sample from the northeast Netherlands and people with high education were under-represented, as is the case in many rural areas. In the current sample, nearly 50% of the parents were middle educated, which is about 10% more than the nationwide average. Table 6 showed that the educational attainment of these parents was related to their language use: Higher-educated parents use language more for informational and educational purposes compared to lower- and middle-educated parents. Informational literacy is also highly related to the degree of symbolic content in jobs. This indicates that parents in this area, who have jobs with a higher degree of symbolic job content, use language for informational purposes. These findings were in line with results from studies by Leseman and colleagues (Leseman, 1999; Leseman & De Jong, 1998; Leseman & Van Tuijl, 2006), who also concluded that parents who have jobs with a high degree of symbolic job content used language more for informational purposes. In contrast to findings in these studies, however, educational attainment and symbolic job content in our sample were *not* related. Moreover, and in contrast to findings in these studies, the recreational literacy scale, which indicates contextualized here-and-now discourse for instrumental or functional purposes, had no relationship in our sample to any of the other parental background characteristics. Apparently, the degree of contextualized language used by parents did not differentiate across educational level or across any of the cultural background characteristics. To summarize, on the basis of our sample we can confirm our hypothesis that higher-educated people in the northeast of the Netherlands, as in many other rural areas, are under-represented. On an aggregate level, there is a relationship between educational attainment and lifestyle elements such as language use and the degree of symbolic content in jobs. We will return to this topic further on.

Another finding involved the development of language proficiency in children in the northeast of the Netherlands. To be more specific, there seemed to be hardly any delay in *receptive vocabulary* from K-2 onwards, since the average score for the *total group* in our sample in K-2 and Grade 1 was at the national average level. These findings contradict previous findings in the same area (Driessen, 2013; Van der Vegt & Van Velzen, 2002; Vogels & Bronneman-Helmers, 2003), along with findings in other rural areas (Durham & Smith, 2006; Vernon-Feagans et al., 2012) that reported language delays in children from rural areas. Three observations, however, need to be made. *First*, children whose parents completed the questionnaire performed significantly better on the vocabulary test than their peers whose parents did not (see Table 3). In K-2, children of parents who did not fill out the questionnaire performed, on average, below the national average level. A closer examination of the table shows that the distribution of the group of children whose parents did not complete the

questionnaire was broader, which indicates that this group was more heterogeneous. Apparently, there was a subgroup of children with relatively low scores on receptive vocabulary within our sample. This finding matched findings by Beekhoven, Jepma, Swart, Duursma, and De Glopper (2011), who also concluded, in an effect study in a comparable rural area in the northeast of the Netherlands, that the average score on the same receptive vocabulary test of three-year-old toddlers was at the national average level, but that the differences within this group were large, and a relatively large subgroup had very low scores. Second, both groups – the group of children whose parents completed the questionnaire and the group of children whose parents did not – differed not only in terms of receptive vocabulary but also in both CRS in K-1 (*Early reading* and *Phonics*) and Early reading in K-2, which are regarded as prerequisites for decoding in Grade 1 (Storch & Whitehurst, 2002). In Grade 1, however, the difference between both groups in terms of decoding was no longer significant, and the scores of both groups were at the national average level. In contrast, in Grade 1, the differences between both groups in terms of receptive vocabulary remained significant. This is a notable finding. One possible explanation could be that it is known that, in the Netherlands, the focus of reading instruction in the early years at primary schools is mainly on decoding, even in kindergarten (De Jong & Leseman, 2001; Wentink, Verhoeven, & Van Druenen, 2012). Furthermore, decoding is regarded as a rather technical skill that requires less cognitive ability than, for example, vocabulary or grammar (Cain et al., 2004; Gough, Hoover, & Peterson, 1996; Rowe, 2013). Initial differences for CRS among children could, therefore, be levelled out through adequate reading instruction. Apparently, it is harder for education to level out differences in OLS. *Third*, in contrast to receptive vocabulary, the score for *productive* vocabulary in all children did remain below the nation average score, although the growth in productive vocabulary between K-2 and Grade 1 was significant. To summarize, we need to be cautious about our findings concerning the language development of children in this region, because the picture we have of language delays in the northeast of the Netherlands appears to be nuanced. On average, in our sample, children from K-2 onwards do not generally experience any delay in receptive vocabulary and in decoding, although there does seem to be a subgroup of children who do have severe delays, particularly when it comes to receptive vocabulary. Unfortunately, we were unable to obtain a clear view of their backgrounds, since their parents did not participate in our research. In the end, we were able to conclude, however, that, on average, initial differences on CRS levelled out once the children were in Grade 1.

The second research question of this study is whether the literacy use of parents in the northeast of the Netherlands with children in the pre-K period can be regarded as a predictor of language proficiency for their children in Grade 1. According to our SEM model, we were able to answer that question affirmatively. The results of the SEM analysis demonstrated an effect of informational literacy on language proficiency in Grade 1, in particular on OLS. Even after controlling for GCA, and even after including preceding language skills as predictors, there was a medium-sized direct effect of informational literacy on OLS. The effect of informational literacy on CRS was indirect and smaller in effect size, but still statistically significant.

The third research question is whether this effect of informational literacy on language proficiency is selective. Put differently, does the relationship between informational literacy and CRS and OLS change over time? Examining the SEM model and Table 6 shows that the effect of informational literacy on language development during the first two years in kindergarten is only significant for CRS. In K-1 as in K-2, these are both indirect effects. In Grade 1, the *indirect* effect of informational literacy on CRS remained modest, whereas the *direct* effect of informational literacy on OLS became medium-sized. This pattern of change between K-1 and Grade 1 is comparable to the effect De Jong and Leseman (2001) found for Grades 1 and 3. The results may indicate that the language use of parents has a kind of a 'sleeper effect' on oral skills in Grade 1. More specifically, it is unclear whether the parents' use of language for informational purposes and for gaining new knowledge, as measured at the beginning stage of formal education, had an effect on their children's oral skills such as word knowledge and grammar knowledge by the time they reached Grade 1, even when controlled for GCA and previous language skills. Although we assumed that the nature of

language use by parents, measured in K-1, at the beginning stage of formal education, continued during K-2 and Grade 1, the effect of this language use on OLS did not appear until Grade 1. This finding stresses the importance of decontextualized parental language input in the preschool years when it comes to OLS later on. And in so doing, this finding is in line with other studies that have shown that academic language input in the preschool years has an effect on specific language skills later on (Leseman et al., 2009; Rowe, 2013; Scheele et al., 2012).

Subsequently, this raises the question about the actual mechanisms involved in language development in rural families. Heath (1986a) presumed that seeing parents incorporating information from written materials not only provides children with 'tools' that in the end lead to better OLS, but also introduces them to a lifestyle, in which the function of literacy is 'reading to learn' or, as Wells (1987) called it, 'communication of knowledge'. This lifestyle, however, is regarded as being an aspect of the dominant literate culture (Collins & Blot, 2003; Leseman, 1994) and is more related to literacy use at school (school literacy) than to a lifestyle, in which language use is highly contextualized and is functional in nature. The latter, however, could be satisfactory within a community, which mainly requires functional language use (Barton & Hamilton, 1998; Heath, 1983). With respect to the lifestyle of the parents in our sample, in which lower- and middle-educated parents were over-represented, we concluded that in many families, language use seemed to be rather contextualized. This implies a difference with language use in school, which is assumed to be decontextualized. The question is whether this gap hinders the children in our sample in their language development. We do know that in our rural sample, parents, on average, do not seem to be oriented that much towards gaining new information; their language use is merely contextualized; on average, these parents do not have a high degree of symbolic content in their jobs. At this stage of language development, however, this lifestyle led to a receptive vocabulary level in this region of the Netherlands that was, on average, comparable to the national average score. This fact, in itself, is encouraging and suggests that the gap is not that large. One observation, however, needs to be made. Although, on average, the receptive vocabulary and grammar score in Grade 1 in this region is at the national average level, there is no guarantee that more complex oral skills, like reading comprehension, will develop without a hitch. There is growing evidence that reading comprehension problems appear about the fourth grade (the so-called fourth-grade slump), when more world knowledge is required and when it is important to read behind the text (Chall & Jacobs, 2003; Heath, 1986a; Leach, Scarborough, & Rescorla, 2003; Leseman & Hamers, 2007). To read behind the text, so-called deep vocabulary is required (Leseman & Hamers, 2007; Proctor et al., 2011), which indicates the varied and nuanced dimensions entailed in vocabulary knowledge (Pearson, Hiebert, & Kamil, 2007). Previous research in comparable rural areas in the northeast of the Netherlands has shown that children have problems with reading comprehension from Grade 4 onwards (e.g. Kruijer & Kassenberg, 2008). Longitudinal research is needed to determine whether (or not) the assumed gap between school literacy and the lifestyle of the parents in our sample will result in reading comprehension problems.

Limitations

There are two limitations to the present study. The first limitation is that the current study suffered from a selective sample vis-à-vis Phonics, Early reading, and receptive vocabulary, which indicated that children of parents who completed the questionnaire performed better than their peers whose parents did not. Participation in school-related activities, such as completing a questionnaire, seemed to predict differences in academic skills when four-year-olds start school. We do not expect, however, that the mechanisms between the language use of parents and later language proficiency as described in our model would end up being different for parents who did not fill out the questionnaire.

The second limitation involves the size of the sample. In SEM, the rule of thumb is a ratio of 1 variable:20 objects. Therefore, we had to create a model without latent variables. In that case, a ratio of 1:5 is sufficient (Kenny, 2014). In small samples, the chance of Type I errors is larger. To prevent this,

we used the CFI measurement for a model fit, since this measurement is regarded as not being sensitive to sample size (Kenny, 2014).

Implications

In the current study, we examined the socio-economic and cultural background characteristics of parents in the north-eastern part of the Netherlands. The study showed that the use of literacy for informational purposes by parents increasingly predicts OLS in Grade 1. Literacy use for informational purposes, however, is a lifestyle feature that is regarded as being related to the dominant literacy. Literacy use of parents in our rural sample, however, appeared to be rather contextualized and functional by nature, and could therefore be regarded as 'vernacular literacy' (Barton & Hamilton, 1998, 2000; Collins & Blot, 2003; Leseman, 1994; Street, 2011). This gap illustrates the complexity of the policy of levelling the playing field (Meijnen, 2003; Neuman & Celano, 2012). It shows the necessity for schools, school boards, libraries, and local authorities to incorporate the lifestyle of parents in the northeast of the Netherlands in tackling language delays.

Second, this research has shown that OLS play an important role in language development, not only for the development of oral skills later on, but also for the development of CRS at the beginning stage of literacy development. Although we agree that the focus during the initial years at primary school is on decoding, we also want to emphasize the importance of incorporating OLS in the curriculum of the early years in school, in particular the development of deep vocabulary (Proctor et al., 2011).

Third, in this research we examined literacy use by parents, using a questionnaire. To deepen our insight into the specific use of language by parents in this Dutch region, the use of observational data is required. A linguistic framework, such as in the studies of the DASH project (Development of Academic language in School and at Home) (Leseman et al., 2009; Scheele et al., 2012), could be useful in analysing the content and specific linguistic structure of parental utterances in the region.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix. Spearman correlation matrix (CORMAT2)

	InfoLit	CRF	K1-CRS	K1-OLS	K2-CRS	K2-OLS	GR1-CRS	GR1-OLS
InfoLit	1.000	0.175	0.300	0.240	0.191	0.250	0.177	0.356
CRF		1.000	0.536	0.597	0.467	0.371	0.475	0.374
K1-CRS			1.000	0.653	0.808	0.509	0.623	0.329
K1-OLS				1.000	0.487	0.680	0.337	0.534
K2-CRS					1.000	0.433	0.733	0.217
K2-OLS						1.000	0.256	0.423
GR1-CRS							1.000	−0.027
GR1-OLS								1.000